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Research Paper

School's out: Parenting stress and screen time use in school-age children during the COVID-19 pandemic

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ABSTRACT

Background During the COVID-19 pandemic, millions of children abruptly moved to online schooling, which required high levels of parental involvement. Family routines were disrupted, potentially increasing parental stress, and may be reflected in greater media screen time use in children.

Objectives To determine whether (1) parenting styles and (2) parenting stress were associated with children's screen time use during the pandemic compared to the pre-pandemic period.

Methods Parents (> 18 years of age) were recruited to complete an online survey regarding changes in their children's (6–12 years) screen time use and daily activities before and during the pandemic. Stress and parental involvement were assessed using the Perceived Stress Scale (PSS) and Alabama Parenting Questionnaires respectively. General linear models assessed whether parenting style and parent stress were associated with children's screen time during the pandemic, adjusting for demographic variables and daily activities.

Results 104 parents were enrolled, and 73 (70.2%) parents completed the surveys. Children's screen time (e.g., watching television and playing video games) increased significantly, from 2.6 to 5.9 h a day ($p = .001$) during pandemic-related school closures. Fewer changes in children's screen time use were significantly associated with greater parental involvement ($p = .017$). Parent stress ($p = .018$) significantly predicted children's screen time use. Lower household income was associated with increased hours of screen time in both models (both, $p < .05$).

Conclusions: Children's screen time increased significantly during the initial months of the pandemic. Parent stress and parenting styles may be modifiable risk factors to promote children's well-being during the ongoing pandemic.

1. Introduction

With the announcement of the COVID-19 pandemic in March 2020, millions of children rapidly switched from in-person to online schooling. Children's well-being may have been unduly influenced by increased screen time use during quarantine periods. Many children lacked access to outdoor activities or in-person social activities and became more dependent on media screen time use. Additionally, with the ongoing health and safety measures to limit the spread of COVID-19, many children continue to receive schooling through online platforms. Thus, the amount of screen time children receive daily is at unprecedented levels. However, current guidelines recommend no more than 2 h a day of media screen time in children over 5 years of age (Canadian Paediatric Society, 2017). Further, media screen time use in children has been associated with adverse mental health outcomes, delayed brain maturation, and impaired social communication skills (Jericho and Elliott,

2020; Paulus et al., 2019).

Several protective factors can aid in promoting children's well-being during challenging times including the quality of the home environment (Bada et al., 2008) and parental involvement (Midel and Reynolds, 1999; Domina, 2005). Additionally, children's physical activity levels (Erwin et al., 2012), sleep patterns (Turnbull et al., 2013) and cognitive functioning (Ellis et al., 2017), have been identified as modifiable risk factors that may promote optimal childhood outcomes in response to challenges faced through online learning during the COVID-19 pandemic. Different parenting styles may affect and predict children's media viewing behaviors. Authoritative parenting styles have been associated with decreased screen time in preschool children (Schary et al., 2012), with relaxed and permissive parenting styles correlated with increased media viewing in early childhood.

During the ongoing pandemic, with the switch to online learning, many parents have been required to accommodate virtual schooling for

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their children, with many schools requiring high levels of parent involvement. Parents are at risk for high levels of stress due to managing at-home schooling and ongoing domestic responsibilities. The organizational format of online learning (i.e., live synchronous classes, multiple platforms for materials and assignments) may have represented a significant stressor and source of anxiety to parents, particularly during quarantine periods. Family violence has increased due to parental anxiety during the pandemic (Humphreys et al., 2020). Parenting anxiety and stress is a major risk factor for adverse parent and child mental health (Crea et al., 2016; Lohaus et al., 2017). Recent research suggests that parenting stress may represent a significant risk factor for increased screen time in children. Increased parenting stress was found to lead to increased screen time in young and school-aged children (McDaniel and Radesky, 2020; Parks et al., 2016). Parents experiencing stress reported providing additional screen time to their children. In one study, mothers who reported lower well-being and perceived having less control over parenting reported increased screen time use in their children (Parks et al., 2016).

In the current work, we conducted an online survey study (June–August 2020) with parents in Ontario, Canada. Our first aim was to evaluate whether screen time of children during the pandemic was associated with parenting styles. Our secondary aim was to determine whether parent stress affected screen time use in children. We also examined how demographic and changes in children's leisure activities during the pandemic were associated with children's screen time use. The screen time of children was assessed based on parents' reports for the time spent watching television and playing video games in the months before (Jan–Feb 2020) using retrospective ratings compared to the initial months of the pandemic (March–July 2020) based on current ratings. We hypothesized that increased parental involvement and reduced parental stress would be associated with fewer changes in the number of hours children spent on screens following pandemic-related school closures.

2. Methods

2.1. Procedures

An online survey study with parents was conducted from June 2nd, 2020, till August 2nd, 2020. Participants were recruited via online ads to recruit parents of school-aged children (6–12 years of age) in the province of Ontario, Canada. School closures and the initiation of virtual education, as well as other COVID-19 response measures, such as closing recreational programs and community centres, were enacted on a provincial level, ensuring all participants experienced similar pandemic responses at the same time. The study protocol was approved by the Research Ethics Board at Western University, London, Canada. Parents provided informed consent.

2.2. Questionnaires

Questionnaires were administered through Qualtrics Survey Software (Qualtrics, Provo, UT). Demographic information from parents was collected, including age and gender of parent, parent's education, relationship to child, composition of the family, whether the child has special needs, family income, city, and the child's school board. To assess daily activities, school-related activities, school and home-based factors parents completed a first set of questionnaires related to the time period before the pandemic (Jan–Feb 2020) based on retrospective ratings and then a second set of questionnaires for the time period when their children were impacted by school closures (March–July 2020).

2.2.1. Children's screen time

Parents provided information on the average time spent by their child, in hours and minutes, watching content on screens and playing video games during leisure time.

School-based factors Parents answered questions which focused on their, and their child's, experience with virtual education. Parent scores for school board-parent, parent-teacher and child-teacher communication were summed with parent and child support, ease of accessing online materials, and amount of parental support required in order to calculate a single score of 'parental satisfaction with the virtual learning experience'. Scores for child engagement and amount of work completed were summed to produce a single score of 'child satisfaction with the virtual learning experience'.

Parental Stress Parents completed the Perceived Stress Scale (Cohen et al., 1983) to measure their current stress.

Parenting Style Parents completed the Positive Parenting and Positive Impact portion of the Alabama Parenting Questionnaire (APQ) to assess positive parenting behaviors.

2.3. Analysis

All statistical analyses were performed using SPSS (version 26, IBM, Armonk, NY). Our first aim was to examine whether positive parenting styles were associated with the change in the number of hours children spent on screens from the time preceding the pandemic compared to the pandemic months when school closures occurred. A general linear model (GLM) was used to investigate whether parenting styles (independent variable) were associated with the change in the number of hours children spent on screens (dependent variable) from the pre-pandemic to the pandemic period. The model was adjusted for family income, whether the child had a special need, total number of children in the home, change in parental work hours (pre-pandemic vs. during the pandemic), change in parental income, parent and child satisfaction with their child's virtual education experience, total number of residents in the household, changes in daily activities, and children's ages. Our second aim was to determine whether parental stress was associated with changes in children's screen time behaviors. A GLM was run with parental stress (independent variable) to examine the association with changes in the children's screen time (dependent variable), adjusting for household income.

3. Results

3.1. Participants

A total of 104 parents were enrolled and 73 parents of 76 children completed the online surveys. Three parents completed the survey for two of their children. The participant demographic information is available in Table 1.

3.2. Measures

3.2.1. Changes in children's screen time

Children's screen time increased during the pandemic compared to the pre-pandemic period. On average children's time spent viewing a screen increased from over 2 h per day (average=2.6 h) to nearly 6 h per day (average=5.9 h) during the pandemic ($t(73) = 9.04, p = .001$). In total, media screen time increased by over 3 h per day during the pandemic.

3.2.2. Parent stress

Parent stress levels were in the moderate to high range (> 13). Stress scores ranged from 0–38, with an average stress level of 21 reported. 21.3% ($n = 16$) of parents reported low stress, while 30.7% ($n = 38$) reported moderate stress and 28% ($n = 21$) of parents reported high stress.

Table 1
Parent demographics in the full cohort.

Characteristics	Total
	<i>n</i> = 73
Females, No. [%]	70 [95.8]
Parent age groups, No. [%]	<i>n</i> = 73
20–29 years	1 [1.4]
30–34 years	2 [2.7]
35–39 years	28 [38.4]
40–44 years	18 [24.7]
45–49 years	17 [23.3]
50 + years	7 [9.6]
Parent education levels, No. [%]	<i>n</i> = 73
High school	11 [15.1]
Diploma/Undergraduate degree	36 [49.3]
Master's degree	9 [12.3]
Doctorate degree	17 [23.3]
Household income levels, No. [%]	<i>n</i> = 65
Low < 40K	10 [16]
Moderate 40–80K	17 [26.6]
High > 80K	38 [59.4]
Child Custody, No. [%]	<i>n</i> = 76
Shared Custody	7 [9.2]
Full Custody	69 [90.8]
Parent Relationship, No. [%]	<i>n</i> = 73
Single Parent	14 [19.2]
Partnered Parent	59 [80.8]
Children living at home, No. [%]	<i>N</i> = 68
One	17 [25]
Two	28 [41.2]
Three	18 [26.5]
Four	4 [5.9]
Five	1 [1.5]
Household members, No. [%]	<i>N</i> = 73
Two	5 [6.8]
Three	17 [23.3]
Four	29 [39.7]
Five	19 [26.0]
Six	1 [1.4]
Seven	2 [2.7]
Child age groups, No. [%]	<i>N</i> = 75
6–7 years	25 [33.3]
8–9 years	18 [24]
10–12 years	32 [42.7]
Children with special needs, No. [%]	<i>N</i> = 74
Yes	20 [27.]
No	54 [73]

Parent demographics, family composition and child characteristics. Special needs were assessed based on a diagnosis of learning disability, neurodevelopmental disorder or gifted. Some participants declined to provide information for some demographic questions thus *n* < 76 for these variables.

3.3. Association of children's screen time with school and home-based factors

Greater parental involvement was significantly associated with fewer changes in the number of hours of screen time use in children ($\beta = .345$, $p = .017$). Additionally, lower household income ($\chi^2 = 13.60$, $p = .004$), the number of children living in the home ($\chi^2 = 12.45$, $p = .014$), as well as decreased parent ($\chi^2 = 36.23$, $p = .014$) and child ($\chi^2 = 25.517$, $p < .001$) satisfaction with the child's virtual education experience was associated with more hours spent on screens in children. The age of the child or total number of household members was not significantly associated with screen time use ($p > .05$).

3.4. Association of children's screen time with parent stress

A GLM examined parent stress and children's screen time use. Parent stress was included as a continuous variable, with income included as a covariate. Higher levels of parent stress ($\beta = .095$, $p = .018$) significantly predicted more hours of children's screen time use, adjusting for household income ($\chi^2 = 8.420$, $p = .038$). The association between

screen time and parent stress is shown in Fig. 1. The number of hours of screen time use was increased in children whose parents reported high stress levels.

4. Discussion

This online survey study examined the factors that were associated with children's screen time usage during the initial months of the pandemic following school closures. On average children's time spent viewing a screen (watching television or playing video games) increased from over 2 h per day in the months before the pandemic to nearly 6 h per day during the initial phases of the pandemic. In total, media screen time increased by over 3 h per day during the pandemic. Online learning practices varied widely across the 26 Ontario school boards represented in our study. Increased parent involvement and decreased parent stress levels were associated with reduced screen time in children.

Countries across the globe engaged in various measures to limit the spread of COVID-19, with many regions closing schools and requiring citizens to remain at home. Although COVID-19 measures differed between countries, findings on children's screen time use from South America (Aguilar-Farias et al., 2020), Europe (Ozturk Eyimaya and Yalçın Irmak, 2021; Schmidt et al., 2020) and Asia (Xiang et al., 2020) during the initial lock-down phases all report increased screen time in children.

Pre-pandemic, the negative effects of excessive television viewing, and the subsequent consequences of associated sedentary behavior has been investigated, and frequently reported in popular media. However, the effects of increased media time during a global crisis have yet to be determined. Little research has investigated the role screen time serves children during pandemic lock-down orders, when socialization opportunities are restricted or even prohibited. Screen time may even offer beneficial mental health effects as children are able to connect socially with friends and family online. Screen time may offer additional benefits to parents who use screens as a coping mechanism during stressful times, and thereby minimizing parent-child conflicts. Longitudinal studies are needed to investigate the long-term consequences of increased screen time in children during the ongoing pandemic on both child and parent mental health, and children's problem behaviors.

4.1. Limitations

This was an online survey study that included retrospective ratings, and we did not assess pre-pandemic stress levels of parents that could be used for subsequent comparison to pandemic levels to determine

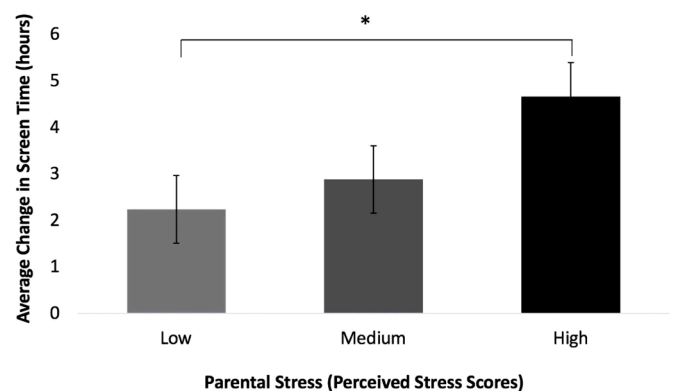


Fig. 1. Media screen time use in children and the association with parent stress levels

Changes in time spent by children on screens, grouped by levels of parents reported stress (low, medium, high) assessed using the Perceived Stress Scale (Wald's $\chi^2 = 7.204$, $p = 0.027$). * denotes statistical significance at $p < 0.05$. Error bars represent standard deviations.

whether school closures and pandemic health measures affected parent mental health. Given the sudden nature of the pandemic, our measures of children's behaviors prior to March 2020 were based on parents' recollections, which may be less accurate than if data had been collected prior to school closures. Additionally, we were unable to measure screen viewing during school hours pre-pandemic, as students do have access to computers and other screen-based technologies in the classroom, nor did we measure screen time for activities such as homework. Study respondents reported higher education levels than the national average (Statistics Canada 2019), thus our findings may not be reflective of the general population.

5. Conclusion

Higher parent stress levels were associated with increased hours of screen usage in children, while increased parental involvement was associated with smaller increases in screen time during the initial months of the pandemic. Increased parental attention may not be feasible for every family, particularly when parents are working full time while caring for children. Future research should investigate the association amongst parent stress, children's screen time and children's mental health and the lived experience of children as the pandemic continues. Disadvantages and benefits of media and social screen time should be explored in relation to mental health outcomes in parents and children during the ongoing COVID-19 pandemic.

Author statement

All authors contributed to the study design. DS collected and analyzed data. DS, EGD and JBM wrote the manuscript.

Declaration of Competing Interest

The authors have no conflicts of interest to declare.

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